

CLAIMS

1. An electrostatic spraying device comprising a capillary spray electrode having a spraying end, and a
5 reference electrode, the electrodes being connected, in use, across a generator in order to establish an electric field between the electrodes and cause fluid in the capillary to be sprayed from the spray electrode, wherein the spray electrode has a focus that defines a point at
10 which the electric field is focussed on the spraying end.

2. An electrostatic spraying device according to claim 1, wherein the focus is a projection extending from a front surface of the spraying end in a direction parallel to the longitudinal axis of the spray electrode.

15 3. An electrostatic spraying device according to claim 2, wherein the projection is rounded with a radius of curvature less than that of the spray electrode.

4. An electrostatic spraying device according to claim 1, wherein the focus is a rod adjacent the spray
20 electrode and extending beyond a front surface of the spraying end in a direction parallel to the longitudinal axis of the spray electrode.

5. An electrostatic spraying device according to claim 4, wherein the end of the rod is rounded with a
25 radius of curvature less than that of the spray electrode.

6. An electrostatic spraying device according to claim 1, wherein the spray electrode has a front surface at the spraying end, the front surface having rounded edges and being disposed at an oblique angle to the longitudinal
30 axis of the spray electrode, thereby providing the focus.

7. An electrostatic spraying device according to claim 6, wherein the front surface lies substantially in a plane.

8. An electrostatic spraying device according to any
35 of the preceding claims, wherein the spray electrode is coated in a layer of dielectric or semiconductor material.

9. An electrostatic spraying device according to any of the preceding claims, wherein the focus defines a point on the spray electrode closest to the reference electrode.

10. An electrostatic spraying device according to any of claims 1 to 8, wherein the focus defines a point on the spray electrode furthest from the reference electrode.

11. An electrostatic spraying device according to any of claims 1 to 8, wherein the focus defines a point on the spray electrode midway between the points furthest from and closest to the reference electrode.

12. A device according to any of the preceding claims, further comprising a reservoir in fluid communication with the spray electrode.

13. A spray electrode for use with the electrostatic spraying device according to any of claims 1 to 12.

14. A method of manufacturing a spray electrode, the method comprising cutting or grinding a capillary at an oblique angle to the longitudinal axis of the capillary to form a spray end, and etching the spray end in order to round its edges.

15. A method according to claim 14, wherein the spray electrode is subsequently coated with a layer of dielectric or semiconductor material.

16. An electrostatic spraying device comprising a capillary spray electrode having a spraying end, and a reference electrode, the electrodes being connected, in use, across a generator in order to establish an electric field between the electrodes and cause fluid in the capillary to be sprayed from the spray electrode, wherein the device further comprises a mechanism for applying a pulsed pressure wave to the fluid as it is sprayed from the spray electrode, thereby cleaning the spray electrode.

17. An electrostatic spraying device according to claim 16, wherein the mechanism for applying a pulsed pressure wave to the fluid is a piezoelectric diaphragm.

18. An electrostatic spraying device according to claim 16, wherein the mechanism for applying a pulsed pressure wave to the fluid is a pump.

5 19. An electrostatic spraying device according to claim 16, wherein the pump is a peristaltic pump.

20. A device according to any of claims 16 to 19, further comprising a reservoir in fluid communication with the spray electrode.

10 21. An electrostatic spraying device according to claim 20, when dependent on claim 18 or claim 19, wherein the pump is adapted to pump fluid from the reservoir to the spray electrode.

15 22. A method for cleaning a capillary spray electrode, the method comprising applying a pulsed pressure wave to a liquid that is sprayed through the electrode in use, thereby cleaning the spray electrode.

23. A method according to claim 22, wherein the pressure wave is pulsed at an ultrasonic frequency.